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TWO NEW MYRMECOPHILOUS MITES OF THE GENUS ANTENNOPHORUS.¹

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THE mites of the genus *Antennophorus*, owing to their extraordinary parasitic relations with various ants of the genus *Lasius*, have been assiduously studied in Europe by Janet, Wasmann, Karawaiew and Berlese, but up to the present time our North American species have remained unknown. A few North and South American mites, to be sure, have been described as species of *Antennophorus*, but they are now known either to belong to different genera or to have a very doubtful taxonomic status. Several years ago I found on some workers of *Lasius umbratus* Nyl. var. *aphidicola* Walsh, at Colebrook, Connecticut, a large, active mite, which Wasmann described as *Antennophorus wheeleri*.² Berlese³ however has recently placed this species in a distinct genus, *Echinomegistus*, which also includes, though in a separate subgenus (*Antennomegistus*), a Brazilian mite which he formerly described as *Antennophorus caputcarabi*. In another paper Wasmann described under the name *A. barbatus*⁴ a large mite which was found attached to a common legionary ant, *Eciton praedator*, in the state of Santa Catharina, Brazil, but it is by no means clear from his brief description, in which he dwells only on a few superficial characters, that the specimen is a true *Antennophorus*. Berlese has shown that still another species, *A. raffrayi* Wasmann, found in nests of *Plagiolepis custodiens* at the Cape of Good Hope, belongs to a peculiar genus which he calls *Physalozercon*. I am inclined to believe from the taxonomic changes which have overtaken

¹ Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University. No. 12.

² Zur Kenntnis der myrmecophilen Antennophorus und anderer auf Ameisen reitender Acarinen. *Zool. Anzeig.*, XXV, 1902, 72.

³ Illustrazione Iconografica degli Acari Mirmecofili. *Redia*, I, 1904, p. 398.

⁴ Neue Dorylinengäste aus dem neotropischen und dem aethiopischen Faunengebiet. *Zool. Jahrb. Abth. f. Syst.* XIV, 1900, p. 41.

all of these species except *barbatus*, and the insufficient evidence of this really being an *Antennophorus*, that the genus will prove to be peculiar to the north temperate zone and to comprise species which are always parasitic on ants of the genus *Lasius*. As this group of ants is abundantly represented in North America, we should expect the parasitic genus to have a like representation. This turns out to be the case, since during the spring of 1909 I succeeded in finding near the Arnold Arboretum at Forest Hills, Boston, Massachusetts, two typical *Antennophori* allied to the four known European species (*uhlmanni* Haller, *foreli* Wasmann, *pubescens* Wasmann and *grandis* Berlese). The American forms occurred, as was to be expected, on workers of the common yellow ants belonging both to the typical genus *Lasius* and to the subgenus *Acanthomyops*, which is peculiar to the nearctic fauna. Only one of the mites, the one I call *A. donisthorpei*, was seen in a living condition. It was perched on the gula, or lower surface of the ant's head, actively waving its long, antenniform forelegs about in the manner so often described for the various European species. There can be little doubt, therefore, that, like its transatlantic cousins, it titillates its host or any ants within reach of its appendages and induces them to feed it with droplets of regurgitated food. Janet¹ has shown that when only a single *A. pubescens* is present on the European *L. mixtus* it clings to the ventral surface of the ant's head, with its forelegs directed towards the ant's mouth-parts. When two are present, there is one on each side of the head or one on each side of the gaster; in the former case the antenniform appendages are directed towards the anterior, in the latter towards the posterior end of the ant's body. When there are three mites, one attaches itself to the gula and the two others to the sides of the gaster. Four place themselves in pairs on the sides of the head and gaster. If six are present, which rarely happens, four are arranged in pairs on the sides of the head and gaster, while of the two remaining individuals, one attaches itself to the gula, the other to the mid-dorsal surface of the gaster. Janet believes that these symmetrical arrangements are for the purpose of balancing the burden and thus making it easier for the ants to carry.

As the species of *Lasius* on which both the European and North American *Antennophori* occur, are specially devoted to attending root-

¹ Sur le *Lasius mixtus*, L'*Antennophorus uhlmanni*, etc. Études sur les Fourmis, les Guêpes et les Abeilles Note 13. Limoges 1897, 62 pp., 16 figs.

aphids and root-cocci and may be said to live in permanent symbiosis with these Homoptera, we can understand why the mites occur only on these particular ants. The plant-lice and mealy-bugs pump the juices out of the plants and pass on to the soliciting ants the unassimilated portions in the form of saccharine excrement, while the ants regurgitate some of the liquid to the mites which ask for it by aping, with their long, hairy, forelegs the antennal movements of hungry ants. In other words the ants serve as cup-bearers, distributing to one another and to the indolent, sedentary *Antennophori* the nectar which the tapster aphids and cocci keep drawing from their vegetable hosts.

Owing to this intimate serial ethological arrangement the worker *Lasii*, unlike most of our ants, do not have to come out on to the surface of the ground to seek their food, but live a hypogaeic, or subterranean life. The eyes of these workers have therefore become so minute that their visual powers must have nearly or quite disappeared. We can, perhaps, best appreciate the relations of these ants to their parasites, if we fancy ourselves blind and condemned to live in dark cellars and continually occupied in pasturing and milking fat, sluggish cows that yielded quantities of strained honey instead of milk. Then let us suppose that occasionally there alighted on our cheeks or backs small creatures which took great care not to annoy us by placing themselves in positions asymmetrical to the median longitudinal axis of our bodies, and stretched forth to us from time to time small, soft hands like those of our children, begging for a little of the honey. Should we not, under the circumstances, treat these little Old Men of the Sea with much lenity or even with something akin to affection?

During the coming spring I shall endeavor to make a more detailed study of the habits of *A. donisthorpei* and of the other species *A. wasmanni*, which, to judge from its longer appendages, must be an even more persevering and impudent beggar. For the present I shall confine myself to giving a description and several figures of both sexes of the two species, so that they may be easily recognized by other students of our North American myrmecophiles.

***Antennophorus donisthorpei* sp. nov.**

Male. (Figs. 1, 2, 4 and 8.) Body nearly as broad as long, broadly oval or subtrapezoidal, broader behind than in front, with very obtuse anterior and posterior borders, the latter in some specimens almost straight. In

profile the dorsal scute is only moderately convex. Dorsal surface and legs yellowish brown, the former smooth and shining, not polygonally areolated under a high magnification, with a darker brown, O-shaped vitta enclosing a large, elliptical, pale central area and separated by a pale border from the edge of the dorsal scute. Ventral surface of body yellowish; sternal and anoventral scutes brownish. Dorsal surface densely clothed with short, rather stout hairs, which are distinctly longer and sparser in front and on the sides than behind. Legs short and stout, anterior border of coxa and trochanter of three posterior pairs not laciniate-denticulate, but entire. Hairs on the three posterior pairs of legs short, stout and distinctly curved, especially towards their tips. Sternum in some specimens connected with the lageniform anoventral scute by a pair of slender processes, which surround the genital orifice. In other specimens (Fig. 2) the two processes are separated from the anoventral scute, and in still others they may be continuous with this sclerite but separated from the sternum. Hairs on the sternum and anoventral scute very short and sparse. Chela rather small, its fixed digit flattened, spatulate and curved, terminating in a round knob; movable digit dilated at the tip where it is bilobed, with one of the lobes folded back.

Length: 750-790 μ ; breadth: 700-800 μ .

Female. (Figs. 3, 5, 6 and 7.) Resembling the male in form and coloration, but somewhat larger. Sternum large, median and entire, with a very few short hairs on its posterolateral portions. Anovenral scute subcordate, prolonged anteriorly as a slender tapering process which terminates between the lips of the genital scutes; covered behind with short, sparse hairs. Genital scutes resembling those of *A. foreli* Wasm. Chela with slender tapering digits, pointed and hooked at their tips and armed on their inner edges with very minute, blunt denticles.

Length: 760-825 μ ; breadth: 780-980 μ .

Described from several males and females taken May 8th, 1909 on the Faulkner Farm, near Forest Hills, Boston, Mass. They were attached to the gular surface of workers of the following ants: *Lasius flavus* L. subsp. *nearcticus* Wheeler; *L. (Acanthomyops) latipes* Walsh; *L. (A.) claviger* Roger and *L. (A.) interjectus* Mayr.

The new species, which I dedicate to Mr. H. S. J. Donisthorpe, the well-known student of British myrmecophiles, seems to be most closely related to the European *A. foreli* Wasm., but the shape of the body is more trapezoidal, the hairs on the dorsal surface are shorter and more abundant, the pale dorsal area is larger, the chelar digits of the female have much smaller and blunter teeth and a different flagellum, and the male chela is of a very different shape, to judge from the figures of Berlese and Karawaiew.¹ The sternum of the

¹ Weitere Beobachtungen über Arten der Gattung *Antennophorus*. (Russian) *Mem. Soc. Natur. Kieff.* XX, 1906, pp. 209-230, 1 fig.

female is much longer and very different in outline and the anoventral scute is less tapering in front.

Several of the female specimens of *A. donisthorpei* each contain a single, large, mature egg, as shown in Fig. 3. This seems to indicate that *Antennophorus*, unlike many other mites and the ticks, is in the habit of producing only one egg at a time. This egg is perhaps attached to the surface of the ant which is infested by the mite.

***Antennophorus wasmanni* sp. nov.**

Male. (Figs. 10, 11, 12, 13 and 15.) Body very convex above, nearly as broad as long, very broadly oval, distinctly wider behind than in front, with its anterior and posterior ends very obtusely angular. Upper surface smooth and shining, polygonally areolated under a high magnification, brown, without a darker vitta or perceptibly paler central area, and covered with longer, more slender and somewhat sparser hairs, than the preceding species. Legs and scutes of the ventral surface brownish, remaining portions yellowish. Legs decidedly longer than in *A. donisthorpei*, coxæ and trochanters of three posterior pairs not laciniate-denticulate. Hairs on these pairs of legs very long and straight. Anovenral scute broad in front, connected with the sternum by two slender bands which enclose the genital orifice. Chela very long; digits slender, subequal, the fixed one simple but not spatulate, its tip curved, blunt and finger-like; the movable digit with a hooked, pointed tip and a flattened, lobular process (adnate spur) on its outer side.

Length: 900 μ ; breadth: 830 μ .

Female. (Figs. 14, 16, 17 and 18.) Resembling the male in form and coloration but somewhat larger. Body broader than long. Sternum larger, subelliptical, median, entire and apparently nude. Anovenral scute short, subcordate, with a rapidly tapering anterior process that terminates between the genital scutes. The latter resemble those of the preceding species and *A. foreli*. Hairs on the anoventral scute very short and sparse. Chela with subequal digits, each terminating in a hooked point, their inner borders armed with larger denticles than in the preceding species and one large tooth on the movable digit.

Length: 990 μ ; breadth 1040 μ .

Described from two males and two females taken May 22d, 1909, on the Faulkner Farm at Forest Hills, Boston, Mass., with workers of *Lasius umbratus* Nyl. var. *aphidicola* Walsh. The mites were not seen till after they had been killed in alcohol with their hosts.

This species is dedicated to the Rev. E. Wasmann, S. J., who has contributed so much to our knowledge of the myrmecophilous insect of all lands. It may be readily distinguished from the preceding species by its much more convex dorsal surface, longer legs, the longer

and straighter hairs on the three posterior pairs of these appendages and the shape of the chelæ of the two sexes. Like the preceding species, *A. wasmanni* seems to be most closely allied to the European *foreli* in having an undivided sternum in the female. In the convexity of its body it resembles *A. pubescens* Wasm., but the male chela is of an entirely different shape, the female sternum is entire and there are fewer hairs on this sclerite and on the anoventral scute of both sexes.

EXPLANATION OF PLATES.

Plate I.

- Fig. 1. *Antennophorus donisthorpei* sp. nov.; male; dorsal view.
Fig. 2. Same, ventral view.
Fig. 3. Female *A. donisthorpei*, ventral view.
Fig. 4. Chela of male, ventrolateral view.
Fig. 5. Genital scutes of female.
Fig. 6. Chela of female; dorsal view.
Fig. 7. Left hind leg of female, ventral view.
Fig. 8. Dorsal scute of *A. donisthorpei*, in profile; *a*, anterior; *p*, posterior end.
Fig. 9. Portion of dorsal integument near posterior end of body.
Fig. 10. Dorsal scute of *A. wasmanni* sp. nov., in profile; *a*, anterior; *p*, posterior end.
Fig. 11. Portion of dorsal integument of *A. wasmanni* near posterior end of body.

Plate II.

- Fig. 12. *Antennophorus wasmanni* sp. nov.; male, dorsal view.
Fig. 13. Same, ventral view.
Fig. 14. Female, ventral view.
Fig. 15. Chela of male, ventral view.
Fig. 16. Chela of female, ventral view.
Fig. 17. Genital scutes of female.
Fig. 18. Left hind leg of female, ventral view.

Wanted, caterpillars, especially of exotic families, and named micros, preferably in alcohol. Wm. T. M. Forbes, Clark University, Worcester, Mass.